

# *What's Driving Natural Gas into Transportation?*



Natural Gas for Transportation Roundtable  
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# The US is awash in natural gas (NG)

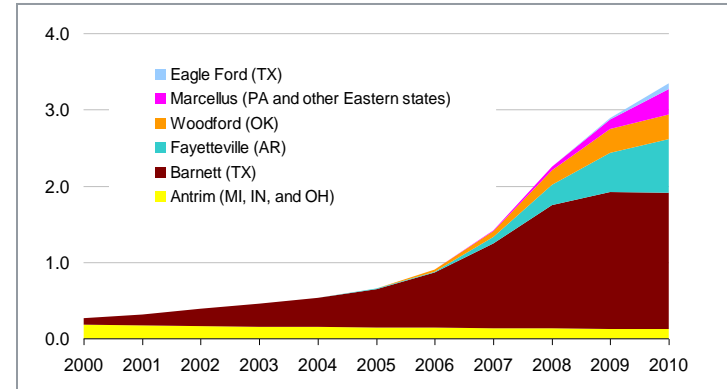


Photo courtesy of American Clean Skies Foundation

- Uncertain environmental implications of new technologies
- With low NG prices, much current production shifted to wet gas & oil
- Potentially large but highly uncertain CH<sub>4</sub> emissions from NG production



barnettshaleanim.zip

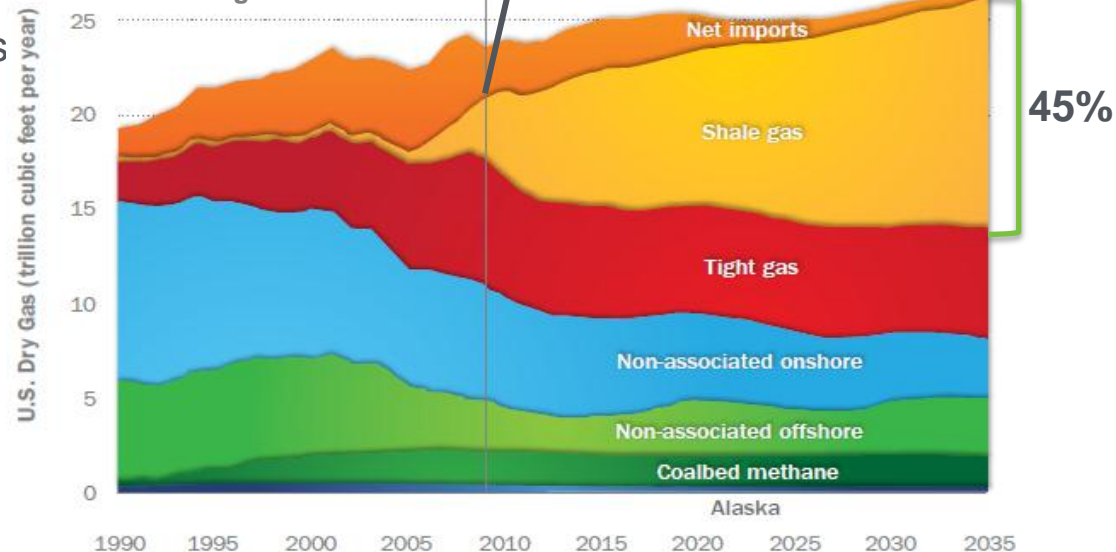


R. Newell, Dec. 16, 2010.

History

Projections

U.S. production of natural gas



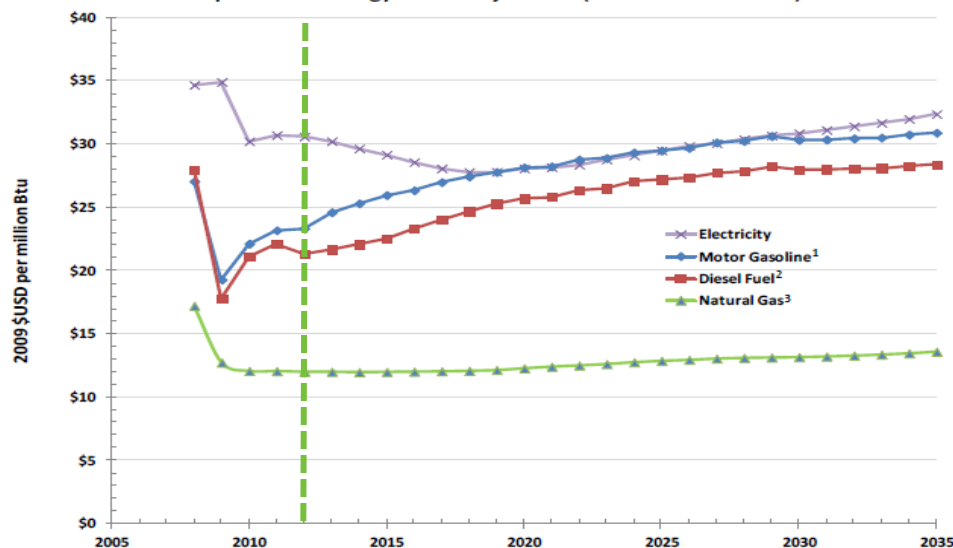
# Key drivers for NG in transportation



- ✓ Availability of NG supplies
- ✓ Price spread between petroleum & NG
- ✓ Availability of NG vehicles
- ✓ Availability of NG stations/fueling

- CWI & Doosan produce big HD OEM engines (9 L ISLG and 15 L HPDI; 11 L GK12)
- CWI planning ISX12 G intro in 2013
- Navistar/ESI introducing 7.3 L
- Many conversions (GM & Ford “CNG ready” HD engines & LD fleet products) through partnerships
- Westport partnering with GM on future products
- Only Honda sells OEM cars in US. Will Toyota, Audi, Chrysler, Ford?
- Chrysler & GM introducing bi-fuel pickups in late 2012
- Vehicle price premiums expected to drop with volume; currently 1-5+ year payback, depending on use

Transportation Energy Price Projections (EIA Reference Case)



1—Sales weighted-average price for all grades. Includes Federal, State, and local taxes.

2—Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

3—Compressed natural gas used as a vehicle fuel. Includes estimated motor vehicle fuel taxes and estimated dispensing costs or charges.



# Fueling infrastructure is coming....



## Current counts and announcements

- 1047 CNG and 43 LNG stations in operation (vs. >120,000 petroleum stations)
- Station counts rose >17% in past year
- Nearly half (488 CNG & 23 LNG) public
- Clean Energy building “America’s Natural Gas Highway”, with 150 LNG stations at Pilot Flying J Travel Centers
- Shell & Travel Centers of America adding 200 LNG fueling lanes to 100 stations; Shell Canada partnering with Flying J
- ~130 new CNG stations assisted by ARRA/Clean Cities & other government sources. Some (Fair Oaks, IN, DeKalb, GA) RNG
- Questar adding 10-12 CNG installations at C-stores, gasoline stations
- Shale gas producers (Encana, AGL, Chesapeake, etc.) converting fleets and building stations



### **Alternative Fueling Station Locator** ▶

Find alternative fueling station locations.



### **Total Stations Count** ▶

Find the number of fueling stations in the U.S. by fuel type.



### **Mobile Alternative Fueling Station Locator** ▶

Find alternative fueling stations on your mobile device.

<http://www.afdc.energy.gov/afdc/>

- ARPA-E funding for low-cost home refueling (13 awards, ~\$30 m)
- Clean Fleets Partnership: 20 fleets committed to adopt alt-fuels, advanced vehicles, petroleum reduction plans
- Clean Cities supporting:
  - National Community Deployment Challenge: a competitive grant program emphasizing deployment at scale and with economic sustainability. Participating communities to meet competitive goals and serve as national leaders for technology deployment models to be replicated elsewhere.
  - JOBS NG (JOBS and economic impacts of natural gas) model to estimate employment impacts of NG vehicles, fueling and fuel supply.
  - Life cycle analysis of shale gas and natural gas: see [http://greet.es.anl.gov/publication-shale\\_gas](http://greet.es.anl.gov/publication-shale_gas)
  - Natural Gas Vehicle Technology Forum: see [http://www1.eere.energy.gov/cleancities/natural\\_gas\\_forum\\_meeting\\_oct12.html](http://www1.eere.energy.gov/cleancities/natural_gas_forum_meeting_oct12.html)



## Clean Cities

### Publications

- Natural Gas Basics
- Guide to Alternative Fuel and Advanced Medium- and Heavy-Duty Vehicles
- Guide to Alternative Fuel Commercial Lawn Equipment
- Clean Cities 2012 Vehicle Buyer's Guide
- Business Case for CNG in Municipal Fleets
- [Clean Cities Vehicle and Infrastructure Cash-Flow Evaluation \(VICE\) Model](#) to evaluate the return on investment and payback period for natural gas vehicles and fueling infrastructure
- Alternative Fuel Price Report

[www.cleancities.energy.gov/publications](http://www.cleancities.energy.gov/publications)

## *Industry*

- **Clean Vehicle Education Foundation**  
(funded by Clean Cities, States, and industry)
  - Coordinates Transit Users Group, School Bus Users Group
  - Produces TUG Bits newsletter
  - Investigates accidents and notifies other users of corrective actions
  - Provides scholarships for cylinder safety courses
  - Conducts studies
  - Teaches Fleets about NGV issues at “The Compelling Case for Natural Gas Vehicles Workshops”
- **Gas Technology Institute**
  - Cylinder testing
- **Private Sector Training Firms**

## *Academia*

- **National Alternative Fuels Training Consortium** (funded by U.S. DOE and member schools)
  - Network of national training centers, consisting of universities, community colleges, and secondary schools, located across the United States
  - Train the trainer programs for technicians on Liquefied Natural Gas Vehicles, Light-Duty NGVs Heavy-Duty Gaseous Fuel Applications, and Compressed Natural Gas Vehicle Fuel Systems Inspections



# Websites and Contact Information



## **Clean Cities Website**

[www.cleancities.energy.gov](http://www.cleancities.energy.gov)

## **Clean Cities Coordinators**

[www.afdc.energy.gov/cleancities/progs/coordinators.php](http://www.afdc.energy.gov/cleancities/progs/coordinators.php)

## **Alternative Fuels & Advanced Vehicles Data Center**

[www.afdc.energy.gov](http://www.afdc.energy.gov)

## **Clean Vehicle Education Foundation**

<http://www.cleanvehicle.org/>

<http://www.cleanvehicle.org/workshop/kansascity.shtml>

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